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The assessment of cancer-related fatigue syndrome in patients with lung cancer during palliative chemotherapy

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Abstract

Introduction: Cancer-related fatigue is one of the most common problems of patients with lung cancer. The assessment of cancer-related fatigue is therefore a significant medical problem in patients during treatment with palliative chemotherapy.

Material and methods: The study included 100 patients during palliative chemotherapy because of lung cancer. The study was conducted in the Department of Pulmonary Diseases and Treatment of Lung Cancer in the Kuyavian and Pomeranian Centre of Pulmonology in Bydgoszcz, in the period from February to June 2016. The study used a socio-demographic questionnaire and Cancer Related Fatigue scale (CRF) consisting of 22 closed questions.

Results: Men accounted for 68% of the study group, people with vocational education — 61%, and people living in the city — 61%. People aged 51–65 formed the largest group. The mean value for behavioural fatigue was 5.34 points, the sensory one — 5.44 points, cognitive/mood fatigue — 4.29 points (moderate levels), whereas mean value for affective fatigue was at a serious level — 5.89 points. The average severity of general fatigue was 5.2 points (moderate level of fatigue).

Conclusions: The moderate level of cancer-related fatigue occurs in half of patients treated with chemotherapy because of lung cancer, and lasts for several months. Behavioural, sensory, cognitive/mood and general fatigue have moderate levels but affective fatigue has a severe level. Radiation therapy affects the severity of cognitive/mood fatigue, lowers economic status, influences behavioural fatigue and education level, and has an effect on general fatigue. In multivariate analysis, only the reduction of economic status has a significant impact on the severity of fatigue.

Key words: lung cancer, palliative chemotherapy, cancer-related fatigue syndrome

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Introduction

Lung cancer is the most common malignant tumour, it poses a huge epidemiological problem. Analysing the mortality rate, we note that it is the most common cause of cancer deaths in men and women. In Poland, the rate of incidence and mortality is higher than the respective average for the European Union countries [1, 2]. Lung cancer is in the advanced stage at the time of diagnosis in most patients and in many patients palliative care is needed [3]. The main goal of care is to reduce the burden of disease, improve quality of life, bring relief from pain and other symptoms associated with the disease [4, 5]. According to statistics, 43% of patients with inoperable lung cancer are provided with chemical treatment. It is therefore important to ensure them the highest quality of life. Overall prognosis is poor because only 10% of patients survive one year [6]. Survival period after the application of palliative chemotherapy has increased slightly from 7.9 to 11.3 months [6].

Cancer-related fatigue syndrome (CRFS) is very common in patients with lung cancer. Undoubtedly, CRF influences physical, emotional and overall patient quality of life [7, 8]. Fatigue is

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a symptom that is very difficult to define, generally speaking, it can be understood as a subjective feeling of weakness, tiredness or exhaustion. It is often associated with a noticeable decline in activity. Fatigue is one of the frequently reported symptoms in patients with lung cancer. Studies show that in the case of cancer, fatigue has a significant impact on quality of life and patient's independence [8]. The incidence of fatigue among cancer patients receiving chemotherapy reaches 75–96%. For patients treated with radiation therapy — 75–100%, and in patients with advanced cancer — 33–89% [7, 9].

Statistics show absolutely that the attempts of treatment are undertaken only in some patients with CRF, and the methods used are often inappropriate or suboptimal [10]. Approximately 40% of cancer patients with symptoms of fatigue do not receive any treatment, and rest is recommended to about 40% of them, modification of diet and taking vitamins are proposed to 10% of them, and pharmaceuticals are recommended to about 6% of patients. Treatment of chronic fatigue in cancer patients should be multi-directed and holistic [11, 12].

The objective of the study was the assessment of cancer-related fatigue syndrome in patients undergoing palliative chemotherapy because of lung cancer.

Material and methods

The study was conducted in the Department of Pulmonary Diseases and Treatment of Lung Cancer in the Kuyavian-Pomeranian Centre of Pulmonology in Bydgoszcz in the period from February to June 2016.

The study enrolled 100 patients who underwent palliative chemotherapy because of lung cancer between the 2nd and 4th cycle. 30 people refused to participate in the study. 8 patients were excluded because of old age, 10 due to obesity and 9 patients because of a serious illness of the osteoarticular system.

The study was based on socio-demographic questionnaire and the cancer-related fatigue scale consisting of 22 closed questions, to which answers depended on the sensation of fatigue at the range from 0 (none) to 10 (very strong). The following division of the severity of fatigue was adopted: 0–3 mild fatigue, 4–6 moderate and 7–10 heavy fatigue. All people were informed about the goal and voluntary participation before the study.

In the following part of the study, the level of perceived fatigue was analysed. Also estimation whether the obtained results were changed by the following selected variables: gender, age (age groups), education, place of residence, radiation therapy, smoking, lowering economic status in relation to cancer was made.

The following variables were analysed: gender, place of residence, treatment with radiation therapy before palliative chemotherapy, smoking and reduced economic status. The Mann-Whitney U test was used to compare two independent samples (groups). To evaluate the variables such as age group and education, Spearman's rank correlation test was used. The level of significance $p \leq 0.05$ was adopted as statistically significant.

Permission for study was obtained from the Bioethics Committee at the Collegium Medicum UMK in Bydgoszcz.

Results

Socio-demographic and clinical characteristics of patients

Men accounted for 68% and patients aged 51–65 for 60%. Most respondents — 61%, had primary/vocational education level. The majority (61%) lived in the city. Most respondents — 57%, were retired/pensioners, 75% of patients were married. The majority — 70%, indicated that they smoked cigarettes. 86% of patients did not undergo radiation therapy before palliative chemotherapy. Information about occurrence of cancer-related fatigue and counteracting it was provided to 83% of patients. 74% of respondents had a feeling of reduction of economic status of their families because of cancer (Table 1).

Cancer-related fatigue

Most respondents reported that they felt tired for several months — 65%, for several weeks — 16%, for a few days — 11% and 8% of respondents did not suffer from fatigue (the time of feeling tired — question No. 1).

Of all the statements about behavioural fatigue, the highest average was 5.6 in terms of the ability to engage in well-liked activity, occupation, while the smallest average for disturbance to the contact with friends — 5.21 points. The average overall score of behavioural/heaviness fatigue was 5.34 points (moderate level of fatigue). Of all the statements about affective fatigue, the most patients indicated the following statement: the level of current fatigue as normal-abnormal — 5.87, whereas the lowest rated statement was: the level of current fatigue as positive–negative — 6.03 points. Average affective fatigue amounted to — 5.89 points (moderate level of fatigue).

Table 1. Socio-demographic and clinical data

Variable		n = %
Sex	Woman	32
	Man	68
Age	40–50 years	8
	51–65 years	60
	> 65 years	32
Education	Primary/ /vocational	61
	Secondary	32
	Higher	7
Place of residence	Village	39
	City	61
Profesional activity	Blue-collar worker	23
	White-collar worker	13
	Retired /pensioner	57
	Does not work	7
Marital status	Single	17
	Married	75
	Widow/widower	8
Smoking	Yes	70
	No	30
Radiotherapy	Yes	14
	No	86
Provide information about fatigue	Yes	83
	No	17
Reduction of economic status	Yes	74
	No	26

Of all the statements on sensory fatigue, the top rated question was as follows: to what extent do you feel strong — 5.35 points, while the lowest rated question read: to what extent do you feel rested — 5.6 points. The average sensory fatigue was — 5.44 points (moderate level of fatigue). Of all the statements on cognitive/mood fatigue, the patients rated as highest the following question: how do you assess your ability to memorise — 2.98 points, and as the lowest they rated the following question: to what extent do you feel joyful — average value — 5.6 points. The average severity of cognitive/mood fatigue was — 4.29 points (lower level of moderate fatigue). Average severity of general fatigue amounted to 5.2 points (moderate level of fatigue). The most severe was affective fatigue at average value — 5.89 points. The least severe was cognitive/mood fatigue, at average value — 4.29 points (Table 2).

Most patients — 44%, felt moderate behavioural fatigue and 42% of patients experienced serious affective fatigue. Sensory fatigue and cognitive/mood fatigue were perceived as moderate by 44% and 55% of patients, respectively. Moderate general fatigue was felt by 51% of people. 6% of patients did not suffer from fatigue at all (Table 3).

Cancer-related fatigue according to the selected variables: sex, age, education, place of residence, economic status, smoking and radiotherapy

There was no difference in the perception of different types of fatigue between men and women ($p > 0.05$). Slightly more women felt fatigue especially in the field of affective fatigue, average value — 6.15 points. Patients had a similar level of experienced fatigue ($p > 0.05$) regardless of age. Patients aged 40–50 had a highest average score of feeling of fatigue, average value — 5.91 points, the lowest one was observed in patients aged 51–60, average value — 4.99 points.

Education had an influence on the perception of each type of fatigue ($p < 0.05$). Higher general fatigue was felt by respondents with primary/vocational education, average value was — 5.75 points, the lowest general fatigue by patients with higher education, average value — 4.08 points. Residents of cities or villages had similar levels of perceived fatigue ($p > 0.05$). Higher fatigue was felt by villagers — average 5.43. Smokers and non-smokers suffered from fatigue at similar level ($p > 0.05$). Slightly higher fatigue was felt by non-smokers — average value 5.31. Reduction of the economic status of the family because of cancer affected the level of perceived affective, sensory, cognitive/mood and general fatigue ($p < 0.05$).

Higher general fatigue was experienced by respondents with lower economic status — average 5.48 points. Radiotherapy had an effect on cognitive/mood fatigue ($p = 0.037$). Higher general fatigue was felt by patients after radiotherapy — average value 5.85 points ($p = 0.453$) (Table 4).

Correlations between various types of fatigue

There were statistically significant strong correlations between various types of fatigue and general fatigue. With the growth of one type of fatigue, the severity of other types of fatigue also grew (Table 5).

Table 2. The mean scores of statements about fatigue

Type of fatigue	No.	Statement/question	Mean/SD	General mean/SD
Behavioral	2	The degree of unpleasantness of fatigue	5.38/2.84	5.34/2.46
	3	Disturbing activities by fatigue	5.33/2.92	
	4	The degree of disruption of contacts with friends	5.21/2.87	
	5	The degree of annoyance in sexual life	5.13/2.81	
	6	The ability to engage in well-liked activity, classes	5.6/2.64	
	7	The degree of intensity and severity of experienced fatigue	5.39/2.74	
Affective	8	The degree of determining of the current fatigue as pleasant or unpleasant	5.97/2.65	5.89/2.55
	9	The degree of determining of the current fatigue as bearable or unbearable	5.62/2.79	
	10	The extent to which you would describe the currently existing fatigue as protective or devastating	5.96/2.68	
	11	The degree of determining the current level of fatigue as positive or negative	6.03/2.8	
	12	The degree of determining the current level of fatigue as normal or abnormal	5.87/2.69	
Sensory	13	To what extent do you feel strong?	5.35/2.57	5.44/2.45
	14	To what extent do you feel awake?	5.4/2.6	
	15	To what extent do you feel excited?	5.31/2.63	
	16	To what extent do you feel rested?	5.6/2.63	
	17	To what extent do you feel energetic?	5.56/2.63	
Cognitive/ /mood	18	To what extent do you feel calm or patient?	5.39/2.71	4.29/1.90
	19	To what extent do you feel relaxed?	5.6/2.61	
	20	To what extent do you feel joyful?	5.6/2.65	
	21	How do you assess your ability to concentrate?	3.5/2.25	
	22	How do you assess your ability to remember?	2.98/2.33	
	23	How do you assess your ability to think?	2.64/2.23	

Table 3. The number of patients in the various grades of fatigue

Type of fatigue	Behavioral	Affective	Sensory	Cognitive/ /mood	General
Degree	n = %				
Lack of fatigue	6	6	6	6	6
Mild	15	12	15	24	15
Moderate	44	40	44	55	51
Serious	35	42	35	15	28
Total	100	100	100	100	100

Table 4. The mean scores of fatigue in groups of variables

Fatigue		Behavioral	Affective	Sensory	Cognitive/ mood	General
Variable				Mean/SD		
Sex	Woman	5.82/1.85	6.15/2.1	5.74/1.95	4.4/1.65	5.49/1.67
	Man	5.12/2.68	5.77/2.74	5.3/2.66	4.23/2.02	5.06/2.37
	p	0.335	0.814	0.297	0.259	0.601
Age	40–50 years	5.88/1.93	6.8/2.5	6.4/2.31	4.81/1.55	5.91/1.93
	51–65 years	5.13/2.46	5.73/2.6	5.05/2.43	4.19/2.01	4.99/2.18
	More than 65 lat	5.59/2.59	5.97/2.49	5.94/2.45	4.33/1.79	5.41/2.23
	p	0.708	0.91	0.321	0.499	0.335
Education	Primary/vocational	5.99/2.23	6.36/2.2	5.95/2.2	4.81/1.72	5.75/1.89
	Secondary	4.41/2.24	5.23/2.7	4.66/2.46	3.51/1.75	4.41/2.13
	Higher	3.93/3.6	4.8/3.9	4.57/3.57	3.21/2.66	4.08/3.35
	p	0.011	0.03	0.021	0.001	0.007
Place of residence	Village	5.79/2.03	6.16/2.33	5.57/2.32	4.35/1.77	5.43/1.92
	City	5.05/2.67	5.72/2.69	5.36/2.55	4.24/1.99	5.05/2.33
	p	0.287	0.54	0.693	0.547	0.802
Smoking	Yes	5.23/2.54	5.88/2.58	5.27/2.47	4.38/1.98	5.15/2.23
	No	5.61/2.26	5.91/2.51	5.85/2.41	4.07/1.73	5.31/2.08
	p	0.755	0.721	0.958	0.527	0.821
Reduction of economic status	Yes	5.59/2.44	6.21/2.5	5.81/2.49	4.49/2.05	5.48/2.21
	No	4.63/2.41	4.99/2.51	4.41/2.05	3.71/1.28	4.41/1.88
	p	0.083	0.036	0.01	0.046	0.007
Radiotherapy	Yes	5.81/1.34	6.74/1.75	6.06/1.74	4.98/1.49	5.85/1.38
	No	5.26/2.59	5.75/2.64	5.34/2.54	4.17/1.95	5.1/2.27
	p	0.766	0.185	0.49	0.037	0.453

Table 5. The relationships between the types of fatigue

	Behavioural	Affective	Sensory	Cognitive/mood	General fatigue
Behavioral		0.850	0.832	0.744	0.940
Affective	0.850		0.795	0.717	0.921
Sensory	0.832	0.795		0.751	0.919
Cognitive/mood	0.744	0.717	0.751		0.844
General fatigue	0.940	0.921	0.919	0.844	

Multivariate analysis of influence of selected variables on the general cancer fatigue

Using a multivariate analysis (logistic regression), the attempt to examine the impact of the selected variables such as gender, age, professional activity, radiation therapy, smoking and reducing the economic status of the family on severity of the fatigue has been made. Only the reduction of the economic status affected the severity of general cancer-related fatigue ($p < 0.005$) (Table 6).

Table 6. Parameters of estimated model of general fatigue

The final loss: 44.153850950 $Chi^2(6) = 14.484$ $p = 0.0247$							
	Constant.B_0	Sex	Age	Professional activity	Smoking	Reduction of economic status due to illness	Radiotherapy
Rating	7.995	–1.332	0.357	–0.290	0.057	–1.639	–1.200
Standard error	3.046	0.729	0.519	0.349	0.603	0.586	1.124
Student t (91)	2.624	–1.827	0.687	–0.831	0.095	–2.798	–1.068
p	0.010	0.071	0.493	0.408	0.924	0.006	0.288
–95%CL	1.946	–2.780	–0.673	–0.984	–1.14	–2.802	–3.433
+95%CL	14.044	0.116	1.387	0.403	1.255	–0.476	1.032
Wald chi^2	6.888	3.339	0.473	0.691	0.009	7.831	1.140
p	0.009	0.068	0.492	0.406	0.924	0.005	0.286
Odds ratio of unit change	2965.897	0.264	1.429	0.748	1.059	0.194	0.301
–95%CL	6.997	0.062	0.510	0.374	0.32	0.061	0.032
+95%CL	1257099	1.123	4.002	1.496	3.508	0.621	2.808
Odds ratio of the range		0.264	2.041	0.419	1.059	0.194	0.301
–95%CL		0.062	0.260	0.052	0.32	0.061	0.032
+95%CL		1.123	16.014	3.351	3.508	0.621	2.808

Discussion

The interest in fatigue felt by oncological patients have increased recently. Taking into account the latest research, it is most common factor deteriorating the quality of life reported by patients [13]. Despite the already known procedures, both pharmacological and non-pharmacological, the problem is often underestimated by the medical community [13].

In the case of cancer patients, the severity of fatigue may result from many factors. Hence, the attempt has been made to investigate whether the variables such as gender, age, education, place of residence, professional activity, smoking, lowering the economic status of the family have an impact on the severity of weariness. The assessment was difficult due to the subjective nature of fatigue. The number of scientific reports examining this issue in patients during palliative chemotherapy is very small.

The vast majority of the respondents were men as confirmed by epidemiological data. More than half of the respondents were aged 51–65, lived in a city and had vocational/primary education. Most women and men declared that they had information about cancer fatigue and how to deal with it. However, other studies deny this. A recent study on people undergoing chemotherapy have shown that nearly half of cancer patients have little awareness about available possibilities of assessing and combating fatigue. Knowledge of the treatment of cancer-related fatigue is still not widespread enough among doctors and nurses [14]. Our analysis shows that despite the diagnosed cancer most patients had not abandoned smoking habit and surprisingly smokers suffered from less severe fatigue.

In our study, patients have already felt fatigue usually for several months. Only few patients did not experience fatigue at all. The Department of Psychiatry and Psychotherapy at the University of Cologne reported that half of cancer patients feel fatigue during diagnostic examination already. In patients undergoing chemotherapy accumulation of symptoms is usually seen after intravenous administration of drugs. It reaches maximum intensity after 48–72 hours from the implementation of chemotherapy and then, in about three weeks fatigue symptoms gradually decrease. A way of feeling the symptoms of chronic fatigue syndrome by patients may be related to the type of chemotherapeutic agents used [15].

The following factors did not have a significant impact on the severity of fatigue: sex, marital status, vocational activity and place of residence. Slightly stronger fatigue was felt by the group

aged between 40 and 50, the lowest between 51 and 60-year-old. According to a study performed in patients after palliative chemotherapy being cared in hospices and also among elder patients, these communities include the largest group of people with low intensity of fatigue [16]. It appears that older people report lower levels of fatigue than the younger one. The fact of lower intensity of sensation of fatigue in the elderly could be explained by their smaller needs and expectations in relation to life. It is easier for them to come to terms with the limitations posed by cancer.

Taking into account the education level, those with higher education felt less fatigue. People with vocational education in everyday life often perform harder physical work than people with higher education. Other studies conducted among people undergoing chemotherapy have demonstrated that patients with higher education have higher levels of fatigue than housewives living with their families [15]. In our study, previous treatment with radiotherapy prior to treatment with palliative chemotherapy had an effect on the severity of fatigue. Research conducted in the Department of Radiotherapy of the European Institute of Radiology in patients undergoing radiotherapy confirms its effect on fatigue, which is observed in most patients [17].

In addition, an attempt was made to examine the severity of individual statements about cancer fatigue, taking into account the selected variables. Behavioural, sensory, cognitive/mood and general fatigue appeared mostly in moderate intensity. Only affective fatigue occurred in severe intensity more often. Other results taking into account the level of fatigue and associated psychosocial factors in the palliative treatment measured at the time, have shown that not every patient suffers from severe fatigue. Almost half of patients do not feel severe fatigue. What is interesting, the level of fatigue does not change during the course of treatment in every third patient [14]. The studies into the impact of fatigue on quality of life in patients undergoing chemotherapy because of lung cancer have shown that most patients have moderate level of fatigue. Every fifth patient does not report fatigue at all during treatment, and the average intensity of fatigue is at a low level [18, 19].

Additionally, a multivariate analysis was made taking into account all previously pre-defined variables, and only reduction of economic status in the family because of cancer had a significant effect on the intensity of fatigue.

Basing on our analysis, the fatigue is a very troublesome problem for most patients with lung cancer treated with palliative chemotherapy. This problem affects almost all patients. Therefore, it is important to conduct further studies assessing the intensity of cancer- related fatigue during cancer treatment. Awareness about the occurrence of cancer-related fatigue and also about how pharmacological and non-pharmacological methods for dealing with this problem can help to improve the quality of life.

Conclusions

1. In patients receiving chemotherapy because of lung cancer, fatigue associated with cancer occurs in moderate intensity and lasts for several months in half of them.
2. Behavioural, sensory, cognitive/mood and general fatigue have moderate intensity, while affective fatigue has severe intensity.
3. Radiation therapy affects the severity of cognitive/mood fatigue, lower economic status has impact on behavioural fatigue, and education affects general fatigue.
4. In the multivariate analysis, only the reduction of the economic status has a significant effect on the severity of general cancer-related fatigue.

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Conflict of interest

The authors declare no conflict of interest.

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